

Claims

1. A method of engraving a plurality of gravure cells in a surface, the method comprising the steps of:
 - 5 (a) mounting an engraving stylus comprising a stylus body inwardly tapering to the stylus tip, in an engraving head;
 - (b) effecting penetration of the engraving stylus into the surface to a desired depth to produce a cell;
 - 10 (c) effecting partial withdrawal of the engraving stylus from the cell;
 - (d) effecting relative movement between the stylus and the surface such that the partially withdrawn stylus effects engraving of a channel of shallower depth than the cell in the surface and having a channel width of at least 40% of the width of the previous cell engraved in the method; and
 - 15 (e) effecting further penetration of the engraving stylus into the surface to a desired depth, and effecting relative movement between the stylus and surface to produce a cell.
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3. A method as claimed in Claim 1 or 2, wherein step (c) comprises withdrawing the stylus from the cell such that the channel formed during step (d) has a width of substantially 45 - 65% of that of the previously engraved cell, preferably substantially 50%.
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4. A method as claimed in any one of Claims 1 to 3, wherein the depth of penetration of the stylus during

step (e) is different to the depth of penetration in step (b).

5. A method as claimed in any preceding claim, wherein the penetration of the stylus is effected to produce cells having a width of between substantially 50 μm to 80 μm .

10. A method as claimed in preceding claim, wherein penetration of the stylus is effected to produce cells having a depth of between substantially 20 μm to 35 μm .

15. A method of engraving a gravure cell in a surface the method comprising the steps of:

15 (a) mounting an engraving stylus in an engraving head;
(b) effecting penetration of the engraving stylus into the surface to a desired depth to produce a cell;
(c) passing direct current through the engraving head 20 to effect continual penetration of the engraving stylus in the surface; and
(d) effecting relevant movement between the stylus and the surface such that the continued penetration of the stylus effects elongation of the engraved cell.

25. A method as claimed in Claim 7, wherein the stylus comprises a stylus body which tapers inwardly to the stylus tip and the method further comprises the steps of:

- (e) effecting partial withdrawal of the engraving stylus from the cell;
- (f) effecting relative movement between the stylus and the surface such that the partially withdrawn stylus effects engraving of a channel of shallower depth than the previous cell in the surface; and
- (g) effecting further penetration of the engraving stylus into the surface to a desired depth, passing direct current through the engraving head and effecting further relative movement between the stylus and surface to produce a cell.

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9. A method as claimed in Claim 8, wherein the method further comprises repeating steps (c) to (g) at least one more time, preferably a plurality of times.
10. A method as claimed in Claim 8 or 9, wherein the depth of penetration of the stylus during step (g) is different to the depth of penetration in step (b).
11. A method as claimed in any one of Claims 7 to 10, wherein penetration of the stylus is effected to produce cells having a width of between substantially 50 μ m to 80 μ m.
12. A method as claimed in any one of Claims 7 to 11, wherein penetration of the stylus is effected to produce cells having a depth of between substantially 30 μ m to 100 μ m.
13. A method as claimed in any one of Claims 7 to 12, further comprising effecting complete withdrawal of the engraving head from the surface after a desired

number of cells have been engraved, and subsequently effecting relative movement between the stylus and the surface, before effecting further penetration of the engraving stylus into the surface to a desired depth 5 to produce a cell, such that there is a portion of the surface which has not been engraved between engraved cells.

14. A method as claimed in Claim 13, wherein there are a 10 plurality of non-engraved portions in any given column of cells.

15. A method as claimed in Claim 14, wherein a non- 15 engraved portion is effected between every 10 to 14 engraved cells.

16. A gravure engraving stylus comprising a stylus holder 20 on which is mounted a stylus body comprising a triangular prismatic or triangular prismoid-shaped tip.

17. A gravure engraving stylus as claimed in Claim 16, wherein the tip is a triangular prismoid-shaped tip.

25 18. A gravure engraving stylus as claimed in Claim 17, wherein at least one angled face of the triangular prismoid-shaped tip is trapezoid in shape, and preferably both angled faces are trapezoid in shape.

30 19. A gravure engraving stylus as claimed in Claim 17 or 18, wherein both angled faces of the triangular prismoid-shaped tip are trapezoid in shape.

20. A gravure engraving stylus as claimed in any one of Claims 16 to 19, wherein one or both faces of the triangular prism or triangular prismoid have the width of at least 10 μ m.

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21. A gravure engraving stylus as claimed in any one of Claims 16 to 20, wherein one or both faces of the triangular prism or triangular prismoid have a width of not more than 80 μ m

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22. A gravure engraving stylus as claimed in any one of Claims 16 to 21, wherein the angle of the inward taper of the angle faces to the apex of the triangular prism or prismoid is between substantially 40° and substantially 90°

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23. A gravure engraving stylus as claimed in any one of Claims 16 to 22, wherein the stylus is a diamond stylus.

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24. A gravure engraving stylus as claimed in any one of Claims 16 to 23, wherein the stylus holder comprises an elongate member, wherein the stylus body protrudes from one end of the stylus holder at an angle of between substantially 15° and 35° to a longitudinal axis of the elongate member.

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25. A gravure engraving stylus comprising a stylus holder on which is mounted a stylus body comprising a planar quadrilateral-faced tip.

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26. A gravure engraving stylus as claimed in Claim 25, wherein the stylus body comprises an inward taper to the planar quadrilateral-faced tip.
- 5 27. A gravure engraving stylus as claimed in Claim 25 or 26, wherein the face of the planar quadrilateral-faced tip is perpendicular to the longitudinal axis of the stylus body.
- 10 28. A gravure engraving stylus as claimed in any one of Claims 25 to 27, wherein the planar quadrilateral-faced tip is a rectangular-faced tip or a square-faced tip or a square-faced tip.
- 15 29. A gravure engraving stylus as claimed in Claim 28, wherein the quadrilateral-faced tip having a width of at least substantially $10\mu\text{m}$.
- 20 30. A gravure engraving stylus as claimed in any one of Claims 25 to 29, wherein the square-faced tip has a width of not more than $80\mu\text{m}$.
- 25 31. A gravure engraving stylus as claimed in any one of Claims 25 to 30, wherein the stylus body is a rectangular parallelopiped shaped body inwardly tapering towards the planar quadrilateral-faced tip.
- 30 32. A gravure engraving stylus as claimed in Claim 31, wherein the angle of the inward taper is between substantially 40° and substantially 90° .

33. A gravure engraving stylus as claimed in any preceding claim, wherein the stylus tip comprises a frustum of a quadrilateral pyramid, inwardly tapering towards a square faced tip.

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34. A gravure engraving stylus as claimed in any one of Claims 25 to 33, wherein the stylus body is a diamond stylus body.

10 35. A gravure engraving stylus as claimed in any one of Claims 25 to 35, wherein the stylus holder comprises an elongate member, and the stylus body protrudes from one end of the stylus holder at an angle of between substantially 15° and substantially 35° to a
15 longitudinal axis of the elongate member.

36. A gravure engraving head on which is removably mounted a gravure engraving stylus of any one of Claims 16 to 24 or a gravure engraving stylus of any one of Claims
20 25 to 35.

37. A gravure engraving apparatus comprising an image scanning and processing means, operably connected to an engraving head as claimed in Claim 36, and an engraving surface, wherein in use, scanned and processed information is transmitted from the imaged scanning and processing means to the engraving head which effects movement of the engraving head to image-wise engrave the engraving surface.
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38. A gravure engraving apparatus as claimed in Claim 37, wherein the image scanning and processing means are separate means.

39. A method as claimed in any one of Claims 1 to 15,
using a gravure stylus of any one of Claims 16 to 35.

5 40. A method substantially as described herein with
reference to the accompanying drawings.

41. A gravure engraving stylus substantially as described
herein, with reference to the accompany drawings.

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42. A gravure engraving head substantially as described
herein, with reference to the accompanying drawings.

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43. A gravure engraving apparatus substantially as
described herein, with reference to the accompanying
drawings.